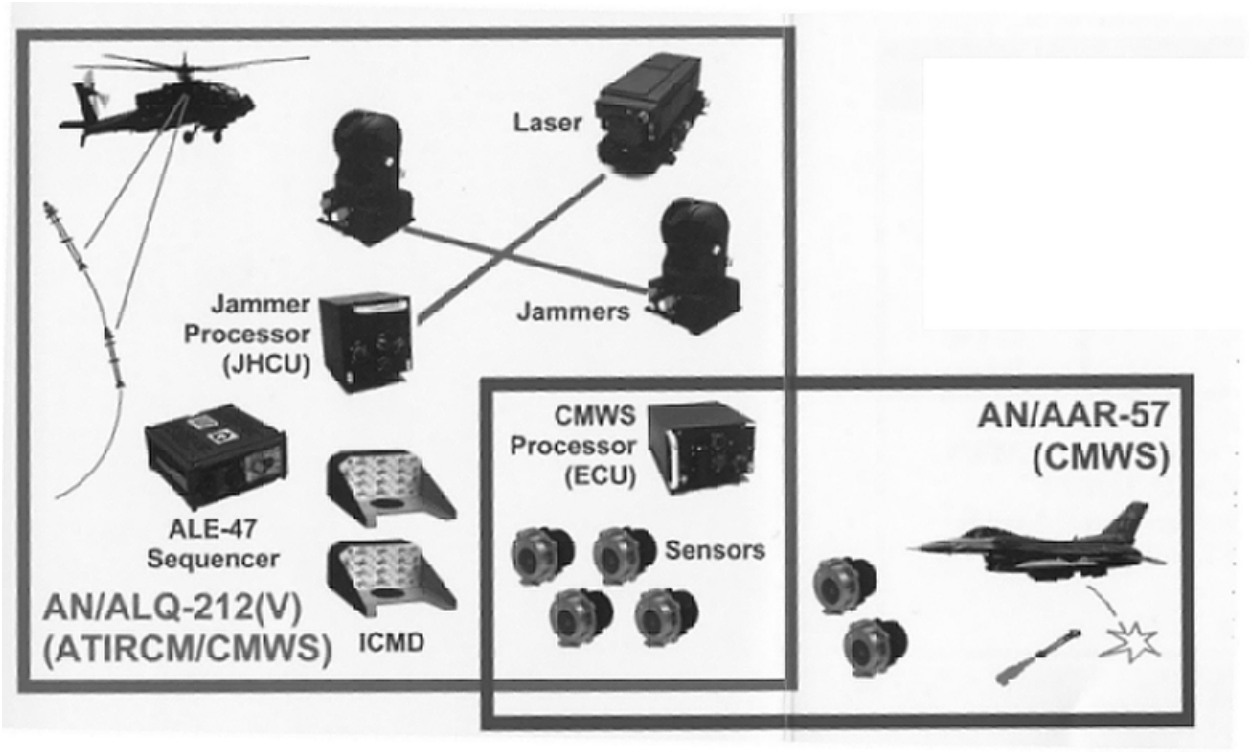
SUITE OF INTEGRATED INFRARED COUNTERMEASURES AND COMMON MISSILE WARNING SYSTEM (CMWS, AN/AAR-57) (SIIRCM/CMWS) INCLUDES: ADVANCED THREAT INFRARED COUNTERMEASURES (ATIRCM, AN/ALQ-212)



Army ACAT IC Program

Total Number of Systems:	2,565
Total Program Cost (TY$):	$3094.7M
Average Unit Cost (TY$):	
ATIRCM B-KIT:	$684K
CMWS B-KIT:	$242K
Full-rate production:	3QFY03

Prime Contractor

SANDERS, a Lockheed Martin Company

Major Subcontractor (CMWS-sensors)

Lockheed Martin Infrared Imaging Systems

Group A Contractors

Boeing, Lockheed Martin Tactical Aircraft Systems, Northrop Grumman

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2010

The Suite of Integrated Infrared Countermeasures (SIIRCM)/Common Missile Warning System (CMWS) contributes to the ***Joint Vision 2010*** concept of ***full-dimensional protection*** by improving individual aircraft's (or ground vehicle) probability of survival against an increasing worldwide proliferation of advanced infrared (IR) guided missiles.

The Advanced Threat Infrared Countermeasures (ATIRCM) is part of the U.S. Army's SIIRCM concept of IR protection including new development sets of IR flare decoys, the Advanced Infrared Countermeasures Munitions, and passive IR features. These features include host platform modifications

such as engine exhaust/heat suppression and special coatings, intended to reduce the platform IR signature. ATIRCM is a subset of the SIIRCM program and is specifically comprised of an active IR jammer for use on helicopters and the passive Common Missile Warning Receiver, which is planned for use on both helicopters and fixed wing aircraft.

The ATIRCM/CMWS design is modular to allow multiple configurations on a wide range of aircraft and other vehicles. The U.S. military services' lead platforms for EMD are the MH-60K (Army), the AV-8B (Navy), and the F-16 Block 40-Close Air Support (Air Force) aircraft. Two ATIRCM laser jam heads are the normal configuration for most helicopters and transport aircraft, though only one ATIRCM jam head is now currently planned for tactical helicopters. CMWS is a software reprogrammable system intended to provide automatic passive missile detection, threat declaration, positive warning of a post launch missile that is homing on the host platform, countermeasures effectiveness assessment, false alarm suppression, and cues to other onboard systems such as expendable countermeasures dispensers. For the Army only, the ATIRCM adds active directional countermeasures via an arc lamp and laser. The Navy is now considering ATIRCM for the SH-60R.

ATIRCM is required to demonstrate integration with the Army's Suite of Integrated Radio Frequency Countermeasures. The Navy Integrated Defensive Electronic Counter Measures (IDECM) program is required to demonstrate integration of CMWS in the IDECM suite on the F/A-18E/F.

BACKGROUND INFORMATION

The SIIRCM/CMWS is a Joint Service, Army lead program. In January 1995, USD (A&T) approved the merger of the Army ATIRCM program with the Navy/Air Force Advanced Missile Warning System program. The program entered EMD in September 1995. The IPT formed in June 1995 produced a TEMP in late December 1995, which was approved by DOT&E upon submission to OSD in April 1996. After expanding the EMD Critical Design Review process, experiencing delays in initial EMD hardware/software production, and adjusting detailed T&E planning, the Acquisition Program Baseline schedule was approved in June 1997, moving the MS III objective/threshold from February–August 2000 to March–September 2001. The Operational Requirements Document was changed in FY97 to include a more realistic threshold-to-objective range for ATIRCM effectiveness. The Joint Project Office (JPO) was relocated from ST Louis, MO to Huntsville, AL during 4QFY97 as part of a Base Realignment and Closure move of the Army Aviation Electronic Combat Project Office. Since the relocation, the JPO has been established and staffed as a separate Project Managers Office directly under PEO Aviation.

TEST & EVALUATION ACTIVITY

In FY98, an Integrated Product Team developed a fully coordinated TEMP update to maintain adequate T&E concepts/resources by accepting additional program schedule risk. T&E funding for the program has been reduced to free funding for other program cost growth and to keep the program executable within available funding levels. DOT&E approved a TEMP update in November 1998.

FY99 test activity has mostly been centered on Test and Measurement (T&M). T&M efforts have continued to gather both instrumented ground truth and prototype sensor views of environmental, threat, and false alarm data. T&M collection events planned during the year slipped to the end of FY99 due to CMWS sensor availability, OFP development difficulties, and cost of the T&M effort.

Some multi-spectral test and evaluation limitations can only be overcome through iterative (i.e., model, test, model) M&S in conjunction with DT/OT events that construct and validate an end-to-end OPEVAL environment. Use of M&S in conjunction with the HITL will be the primary way to perform an end-to-end test of the system. Supporting system development and some aspects of the M&S effort are also dependent on the prime contractor's system design process and hardware deliveries. The approved TEMP T&E concept for the CMWS included Hardware-in-the-Loop (HITL) testing that is under development at AFEWES, Ft Worth, TX. Project Office development of the HITL began in December 1998, with a proof of concept (POC) demonstration conducted in March 1999. The POC demonstrated feasibility of projecting threat signatures on a dome surface and detecting them with a CMWS sensor. Use of a dome HITL for the end-to-end testing of IR/UV missile warning sensors has not been done before and presents several technical challenges. Data from the March POC is still being studied, but initial results indicated that HITL capabilities support the program's T&E strategy for CMWS testing and validation of IR threats in a multispectral threat environment. A more comprehensive POC is planned in October 1999, which will include testing against several different scenarios with multiple CMWS sensors. Delayed hardware deliveries and Operational Flight Profile (OFP) software development have precluded any assessment of an integrated SIIRCM/CMWS system until 2QFY00.

Hardware-in-the-Loop (HITL) capabilities are essential in providing an assessment of the operational effectiveness and operational suitability of the ATIRCM/CMWS system. Live fire and drone requirements have been reduced from nearly 400 to 175 events by developing new T&E concepts. Without a properly validated and verified HITL, DOT&E does not believe the M&S methodologies developed by the Project Office will be valid.

In March 1999, ATIRCM/CMWS sensor and jam head laser production difficulties, OFP development delays, and other EMD issues resulted in a cost and schedule breach and subsequent rebaselining of the program. The Project Office's primary efforts during FY99 was the restructuring of the program, though T&E resourcing and M&S development efforts continued. M&S efforts and software development showed good progress as evidenced by implementation of software engineering control standards and incremental M&S software development. Progress has also been made towards integrating M&S into both the Systems Integration Laboratories (SIL) (located at the contractor's plant and several government facilities) and the HITL. Nearly all T&E test assets have been procured, with scheduled test activity awaiting contractor delivery and government acceptance testing of system components. The new schedule allows: (1) the Project Office to solve EMD delays; (2) delivery of a more robust Operational Flight Profile (OFP) for M&S with HITL; and (3) more coordinated DT/OT testing.

TEST & EVALUATION ASSESSMENT

In October 1998, the JPO identified funding shortfalls that would adversely impact delivery of required EMD components to support DT. Delays in completing the system design and initial EMD hardware deliveries resulted in subsequent delays in completing T&E related events. Most notably this has contributed to delays in the development of system OFP software required to complete challenging modeling and simulation activities.

Modeling and simulation are critical elements of the test and evaluation program because the extensive matrix of potential missile-aircraft interactions to be evaluated would require a substantial increase in the number of test firings. M&S will be used to examine many of those interactions while simultaneously reducing program costs. However, the FY99 slip in the program schedule caused by continued EMD hardware development difficulties has adversely impacted software deliveries essential

to the M&S effort. The aggressive continuum of M&S intended to support development, hardware (and software) in the loop testing, open air range testing, installed equipment testing, and IOT&E of the system is dependent upon timely delivery of OFP and system hardware. Continued delays in contractor furnished EMD hardware/software will impact the test program significantly.

Aircraft integration schedules are at risk due to delayed EMD deliveries, and have resulted in an Air Force decision to delay CMWS test, integration, and production on the lead fixed wing platform, the F-16. RDT&E funding for fixed wing integration and test efforts is fully funded in FY00, but T&E funding is insufficient to conduct fixed wing integration and test efforts in accordance with the program's acquisition strategy.

Additional program schedule risk accepted by the Project Office in the current TEMP is attributable to a reduction in available T&E resources (QF-4 drone targets, test instrumentation packages, spare threat missiles and missile telemetry kits, etc.) to absolutely bare minimums. Mitigating features of the test design and M&S efforts are intended to help control scarce test resources. The program's schedule is tight with little allowance for developmental delays, and the possibility exists that no platform will be available to conduct fixed wing T&E requirements. If expenditure of EMD resources exceeds the rates anticipated, system integration efforts are delayed, or fixed wing T&E funding issues are not resolved, the test program will be forced to halt: (1) pending identification of the EMD integration and test problems; (2) procurement of additional funding sources; and (3) time required for the procurement and build-up of replacement test resources to complete the minimum adequate IOT&E identified in the TEMP.

To reduce risk and cost to the program, DOT&E agreed to a test strategy that utilized the Aerial Cable Facility (ACF) at the White Sands Missile Range for all rotary-wing live missile-firing events. The Project Office is investigating using other ranges for a portion of the missile firing events to further reduce cost, but the impact to the test strategy has yet to be assessed. DOT&E believes that use of the ACF is central to an adequate and suitable test program.

The operational configuration for tactical helicopters calls for only one ATIRCM jam head on the top of the platform behind the rotor and two jam heads for transports and large helicopters. The operational consequences of a single jam head needs to be assessed to ensure adequate defensive protection exists when the single jam head is masked due to the aircraft fuselage and during tactical employment of host platforms.